REMARKS

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claims 1, 5 and 17 to recite that the depths of air vents are set to a fixed value "by a movable air vent portion." Moreover, Applicants have amended dependencies of claims 12-16, such that these claims are each dependent on claim 6; and have further amended claims 11, 12 and 15 to recite that the depths of the air vents are set to a fixed value by the movable air vent portions.

In addition, Applicants are adding new claims 21 and 22 to the application. Claim 21, dependent on claim 1, recites the force applied by the movable air vent portions to the board, consistent with the description in the last paragraph of page 13 of Applicants' substitute specification submitted with the Supplemental Preliminary Amendment filed October 29, 2003, (hereinafter "Applicants' substitute specification). Claim 22, dependent on claim 1, recites that the movable air vent portion is in a mold portion of the mold and movable relative to this mold portion of the mold. Note, for example, and not to be limiting, the last full paragraph on page 17 of Applicants' substitute specification.

The rejection of claims 12-16 under the second paragraph of 35 U.S.C. §112, set forth in Items 2 and 3 on page 2 of the Office Action mailed June 20, 2005, is noted. It is respectfully submitted that this rejection is moot, in view of amendment of dependency of each of claims 12-16, such that these claims are dependent on claim 6.

The indication of allowable subject matter set forth in Items 8 and 9 on page 4 of the Office Action mailed June 20, 2005, is noted with thanks. In view thereof, it is

respectfully submitted that claims 6-10 and 12-16 are free of the applied prior art. It is respectfully submitted, however, that these claims need not be rewritten in independent form in order to be allowable, as all claims presently pending in the application should be allowed as discussed infra.

It is respectfully submitted that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed June 20, 2005, that is, the teachings of the U.S. patents to Shimizu, et al., No. 6,676,885 and to Saxelby, et al., No. 5,728,600, under the provisions of 35 U.S.C. §102 and 35 U.S.C. §103.

It is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such a fabrication method of a semiconductor integrated circuit device as in the present claims, including, inter alia, use of the mold, and setting depths of air vents communicating with cavities of the mold to a fixed value by a movable air vent portion and filling sealing resin in the inside of the cavities of the mold. See claim 1. Note also claims 5 and 17.

In addition, it is respectfully submitted that these references would have neither taught nor would have suggested such fabrication method as discussed previously in connection with each of claims 1, 5 and 17, including, inter alia, setting depths of air vents communicating with cavities of the mold to a fixed value by a movable air vent portion, and wherein the method includes additional features as in the dependent claims in the application, including (but not limited to) wherein the movable air vent portion is in a mold portion of the mold and movable relative to this mold portion of the mold (see claim 22); and/or wherein the movable air vent portion applies a force of approximately 9.8-49 Newtons to the board (see claim 21); and/or

specifics of the board as in claims 2 and 4; and/or wherein a plurality of multilayered printed wiring circuit boards are prepared and the mold is closed after these plural boards are arranged over a mold surface of one mold, as in claim 3.

The present invention is directed to a fabrication technique utilized in the manufacture of a semiconductor integrated circuit device, in particular, a technique applicable to resin molding in assembling printed wiring circuit boards.

In molding such boards, a problem rises in that air voids are formed in end portions of the mold, during the molding process. Such occurrence of air voids is due to, for example, clogging of resin in air vent portions, and it has been proposed that such occurrence of air voids can be suppressed by preliminarily preparing data corresponding to a thickness of a lead frame at the time of performing resin molding and adjusting the opening in the air vent portion by inputting such data at the time of resin sealing. However, such proposed technique includes undesirable further processing, including wherein each time the thickness of a lead frame is changed, it is necessary prepare input data for adjusting the opening in the air vent portion. Moreover, a further problem arises in that where a resin-made board is softer than the lead frame, additional adjustment is necessary in the opening in the air vent portion.

Against this background, Applicants provide a method wherein air voids during the molding procedure can be avoided, and also wherein it is possible to clamp the upper and lower mold portions of the mold with less clamp pressure, thereby avoiding deformation of the board due to such clamp pressure. Applicants have found that by utilizing the movable air vent portion as in the present claims, providing a depth of air vent which is a fixed value, the fixed value for the depth of

the air vent being achieved without the need for preliminarily inputting data of, e.g., board thickness, and without the need for increased clamping pressure. Thus, according to the present invention, utilizing the movable air vent portion, an air vent depth can be provided with a fixed value, even where there is a variation in the substrate (board) thickness.

As to advantages achieved according to the present invention, utilizing the movable air vent portion providing the fixed value for the depth of the air vents, note, for example, the last full paragraph on page 23, and the second and third full paragraphs on page 24, of Applicants' substitute specification. See also the first full paragraph on page 17 of Applicants' specification, as well as the paragraph bridging pages 15 and 16 thereof.

Shimizu, et al discloses a resin-molding method, in particular a transfer molding technique wherein plural semiconductor devices are bonded onto one face of a single circuit board for subsequent batch resin encapsulation of the plural semiconductor devices in a single cavity formed by molding dies. As applied by the Examiner, this patent discloses in e.g., Fig. 3A and the corresponding description in connection therewith at column 12, lines 45-49, an air vent 46 provided in the dummy cavity side for allowing the internal gas in the cavity 23a to be discharged in the injection of the molten resin 26, the air vent 46 comprising a channel groove formed on a face of the top die 21. Note also column 6, lines 28-40 of Shimizu, et al, generally describing the resin-molding method disclosed in this patent, including wherein in a closing state of the cavity a first pressure is effected to a front face of the circuit base member and a second pressure is effected to a back face of the circuit base member, the first pressure being greater than the second pressure, so

as to secure the circuit base member to the mounting face.

Noting air vent 46 in Shimizu, et al, it is respectfully submitted that this is the conventional air vent provided in the mold member, the air vent path being dependent upon pressing of the mold portions against the board, whereby, for example, the air vent path can become small by a larger pressure of pressing the mold portions against each other to avoid resin leakage. Importantly, note that in Shimizu, et al one cannot control of the depth of the air vent path, independently of sealing between the mold and the board. In contrast, according to the present invention using the movable air vent portion as in the present claims, the depths of the air vents can be provided to a fixed value, in essence independent of the total pressure applied between the mold portions.

It is respectfully submitted that the additional teachings of Saxelby, et al would not have rectified the deficiencies of Shimizu, et al, such that the present invention as a whole would have been obvious to one of ordinary skill in the art. Saxelby, et al, discloses a method for encapsulating portions of a circuit formed in a substrate, the encapsulating surrounding, in molding compound, a portion of one of the faces of the substrate in the portion of the sides of the substrate, and, during encapsulation, a portion of the one face of the substrate that bears conductive paths is left unencapsulated. Note column 2, lines 1-6; see also column 2, lines 12-16. See further column 5, lines 42-52, together with Fig. 19, describing several circuits connected to similar printed circuit boards, being molded simultaneously.

Saxelby, et al further discloses, in column 6, lines 1-13, that a thickness of a printed circuit board can vary by as much as 0.002 inches from waste portion 20a to waste portion 20j (see Fig. 20) thereof; and that in order to mold several circuits

simultaneously variation in thickness of the printed circuit board is accommodated for in the mold by ridges 62 and 78, the ridges compressing the printed circuit board where the printed circuit board is thickest and being close against, but not compressing the printed circuit board where the printed circuit board is thinnest.

Even assuming, arguendo that the teachings of Saxelby, et al were properly combinable with the teachings of Shimizu, et al, such combined teachings would have neither disclosed nor would have suggested the presently claimed method, including, inter alia, setting the depth of the air vents communicating with cavities of the mold to a fixed value by a movable air vent portion, and advantages thereof.

In particular, emphasizing that Shimizu, et al discloses that the air vent includes a channel groove formed on a face of the top die 21, it is respectfully submitted that the disclosure of this patent would have taught away from the movable air vent portion as in the present claims, and especially such movable air vent portion as in, e.g., claim 22, which is in a mold portion of the mold and movable relative to this mold portion of the mold.

The contention by the Examiner that Shimizu, et al discloses "setting depths of air vents 45a communicating with the cavity of the mold to fixed value", the Examiner referring to column 12, lines 60-65 of Shimizu, et al, is noted. However, it is respectfully submitted that the structure represented by reference character 45a in Shimizu, et al is an opening connected with an adsorption groove 63 formed in the peripheral region, these openings 45a being holes to vacuum adsorption of the resin film. The Examiner's attention is especially directed to air vent 46, in Shimizu, et al, which is a channel groove formed on a face of top die 21. In any event, as discussed previously, it is respectfully submitted that used the air vents in Shimizu,

et al, would have neither taught nor would have suggested the step of setting depths of the air vents to a fixed value by a movable air portion as in the present claims.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently in the application are respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (referencing docket no. 501.43128X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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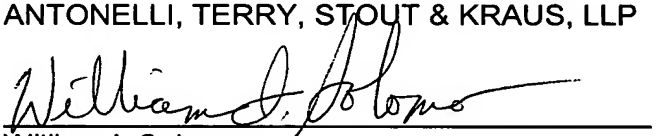

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